

No. 750,601.

PATENTED JAN. 26, 1904.

F. CLEFF.
APPARATUS FOR DYEING, &c.
APPLICATION FILED JULY 16, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

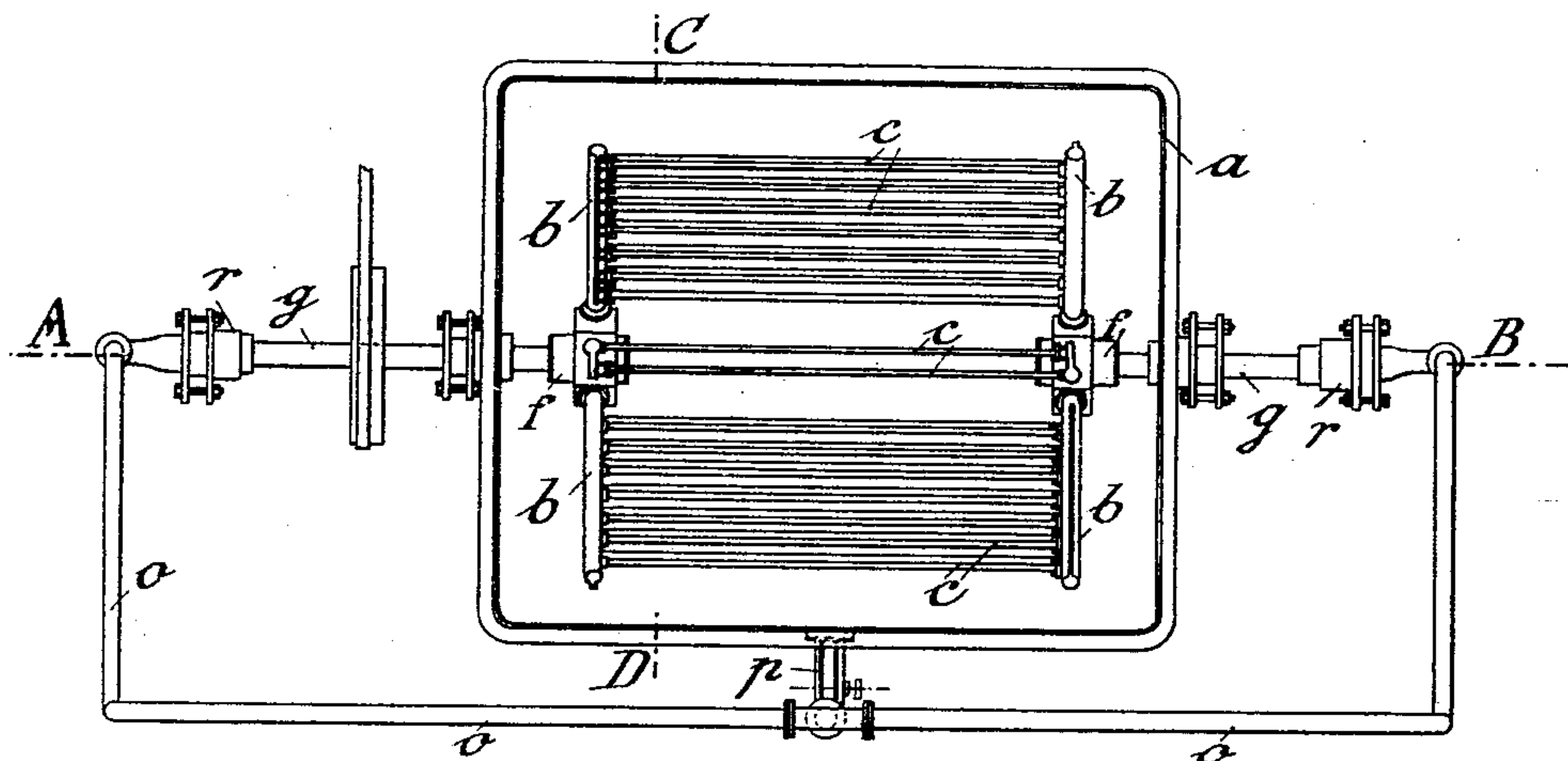
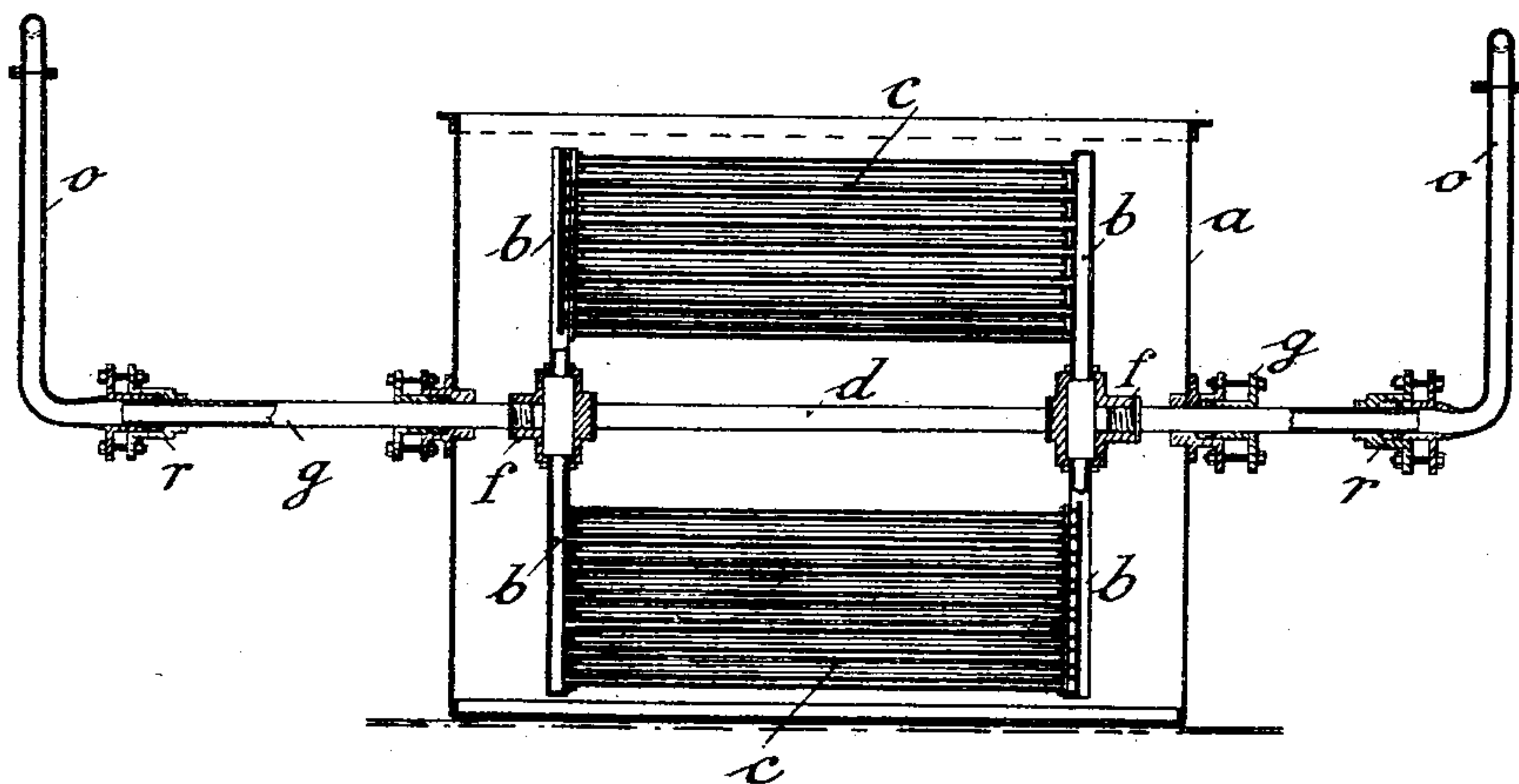


Fig. 2.



Witnesses:

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Friedrich Cleff

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3 SHEETS—SHEET 2.

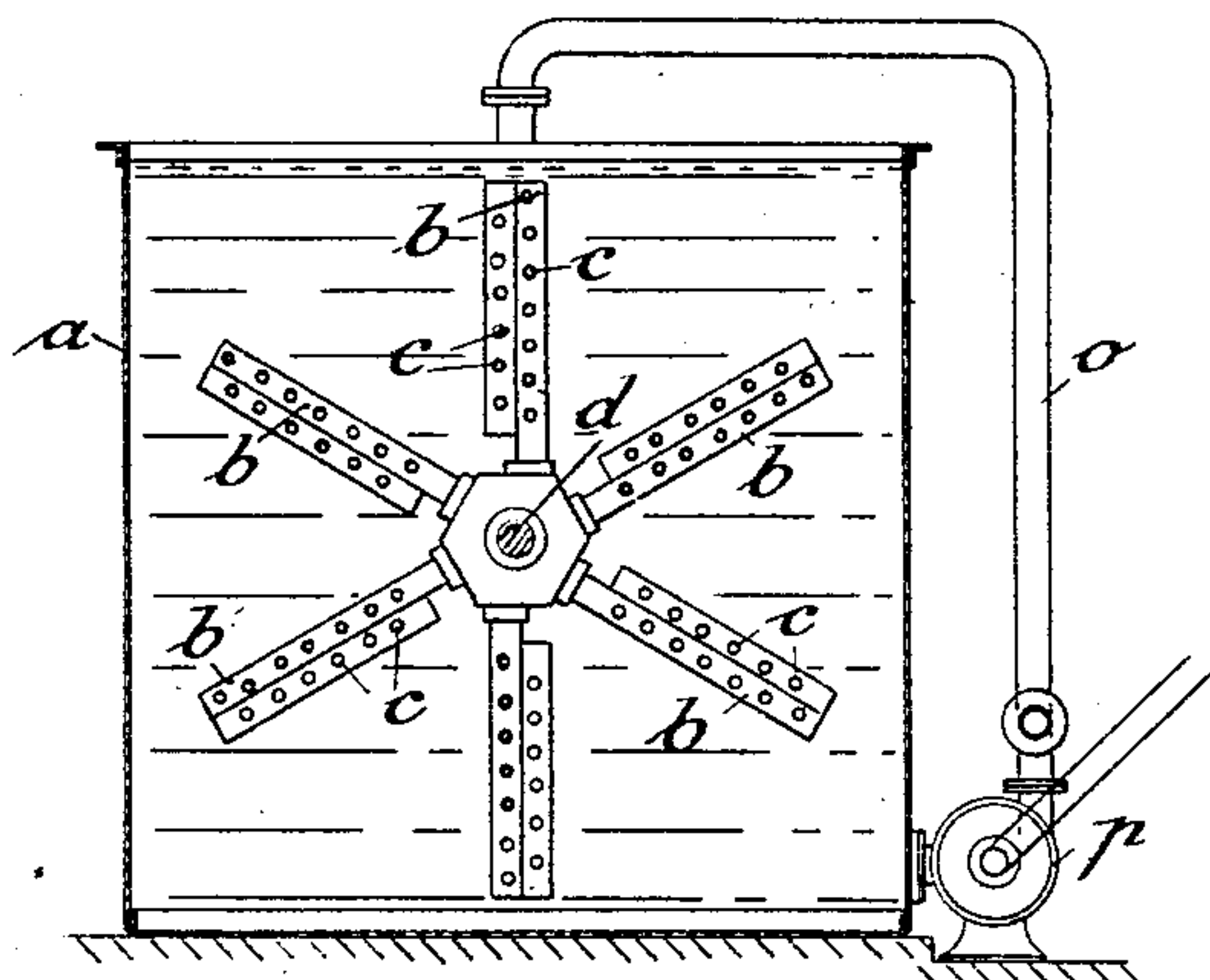


Fig. 3.

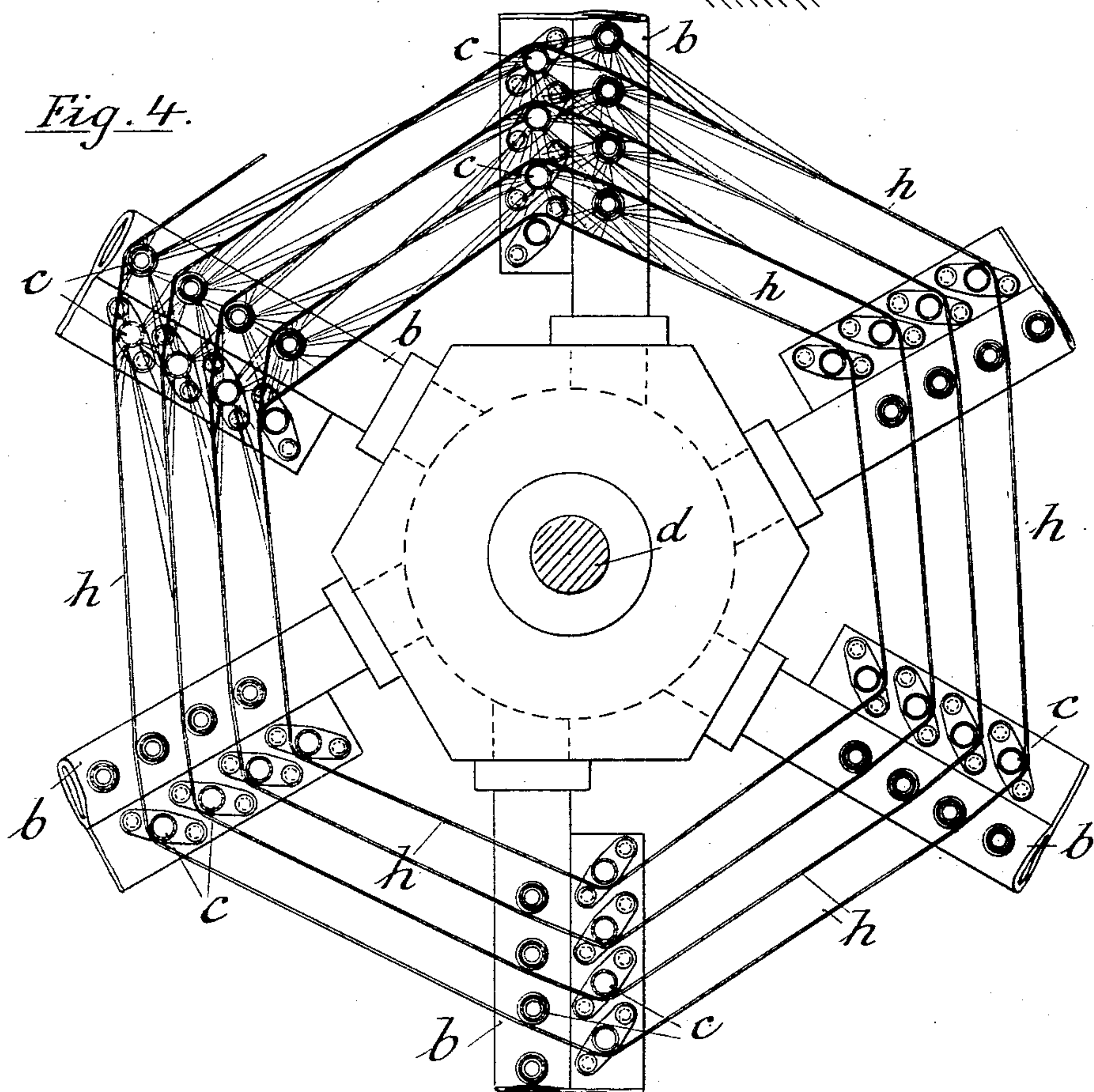


Fig. 4.

Witnesses:

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J. A. Ritterhand

Inventor:

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NO MODEL.

3 SHEETS—SHEET 3.

Fig. 5.

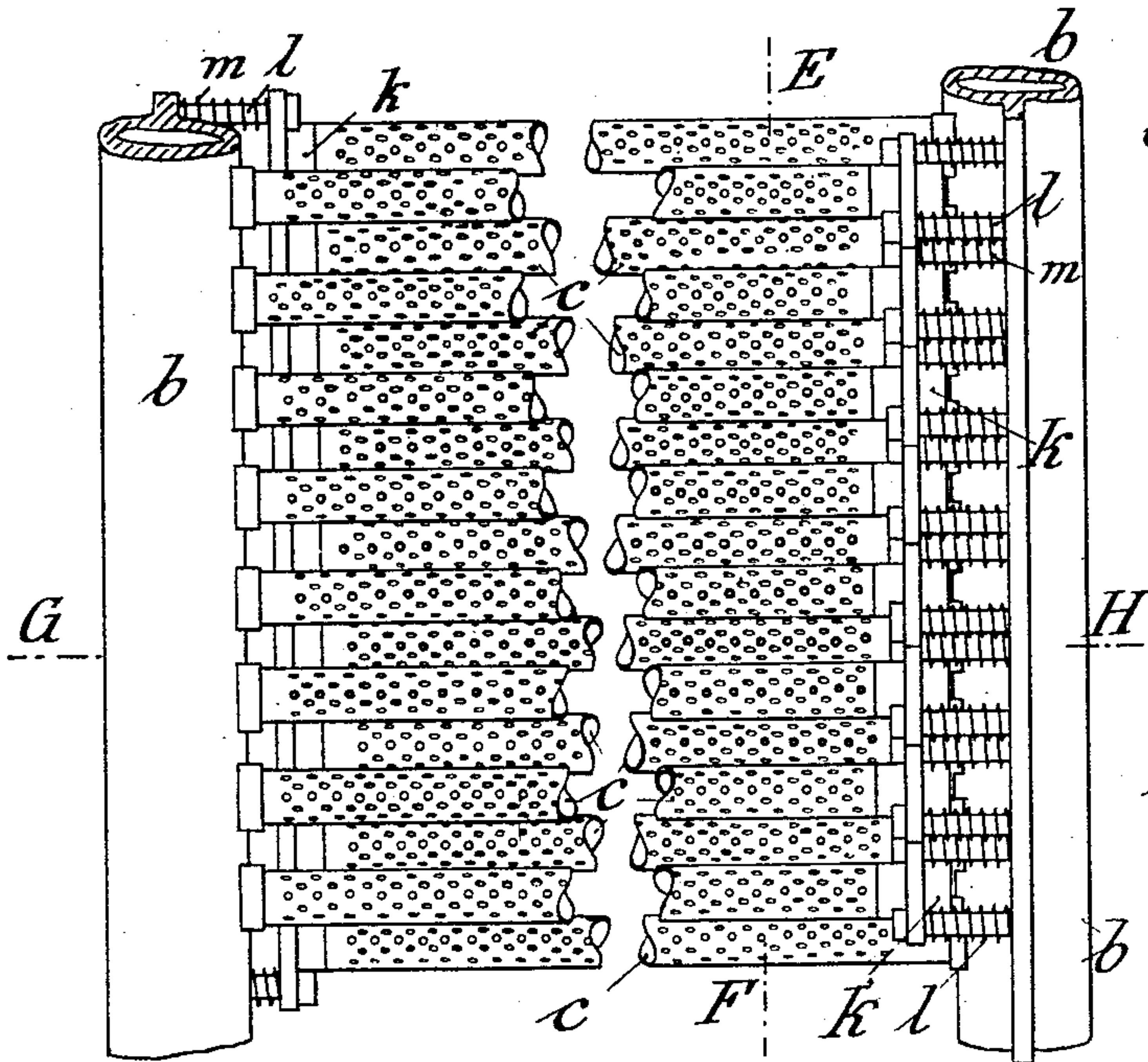


Fig. 6.

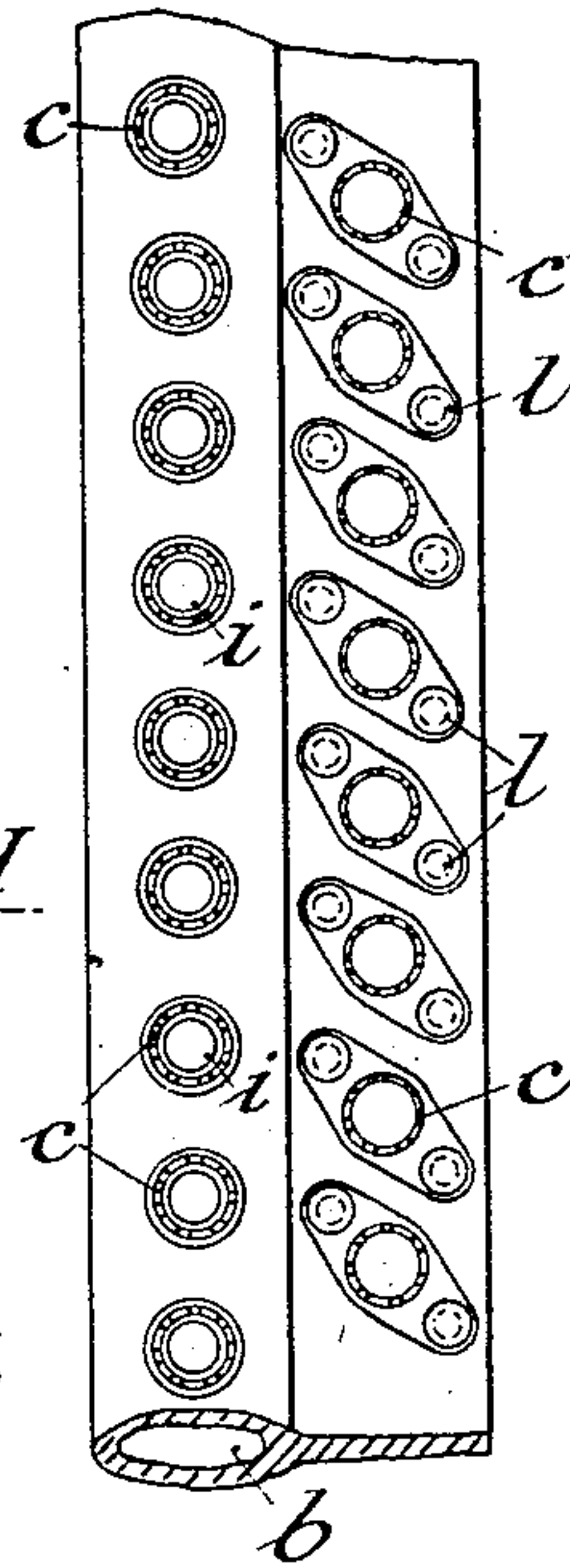
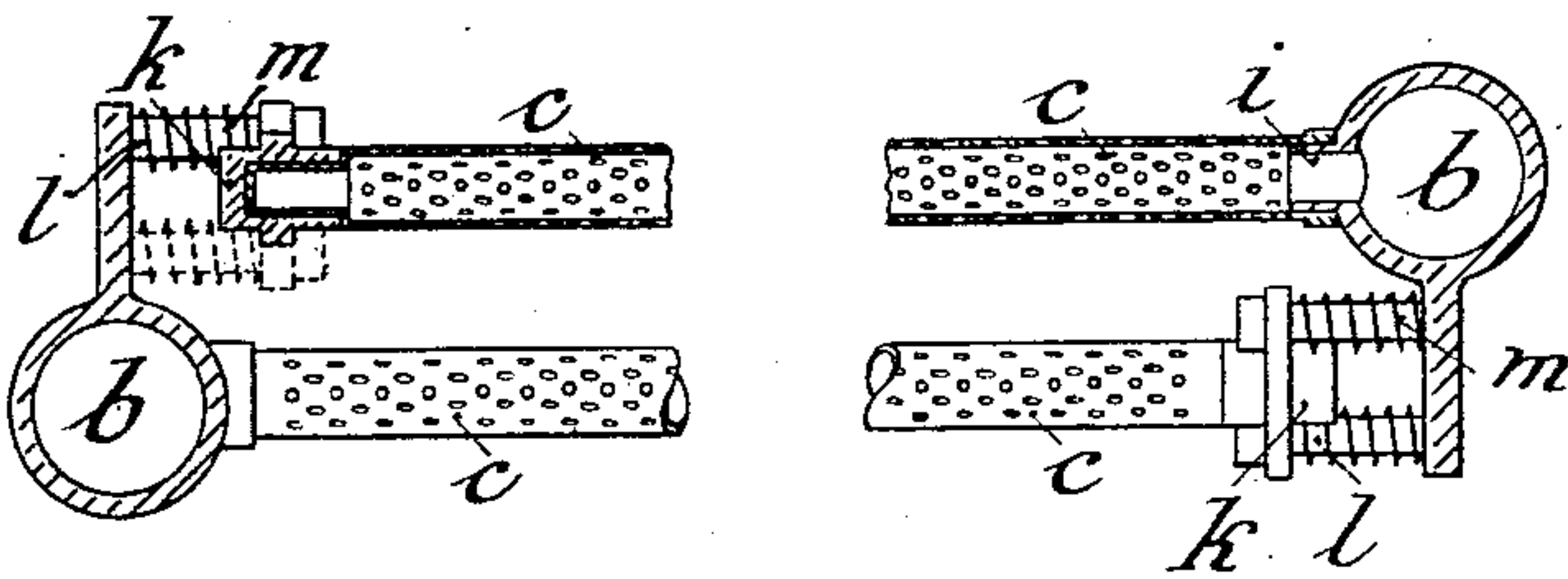


Fig. 7.



Witnesses:

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Fabrikant.

Inventor:

Friedrich Cleff

UNITED STATES PATENT OFFICE.

FRIEDRICH CLEFF, OF RAUENTHAL, NEAR BARMEN, GERMANY.

APPARATUS FOR DYEING, &c.

SPECIFICATION forming part of Letters Patent No. 750,601, dated January 26, 1904.

Application filed July 16, 1903. Serial No. 165,835. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH CLEFF, a subject of the Emperor of Germany, residing at Raumenthal, near Barmen-Rittershausen, in the Kingdom of Prussia, German Empire, have invented new and useful Improvements in Apparatus for Dyeing, Bleaching, Mordanting, Washing, and Drying Fabric and the Like, of which the following is a specification.

The method of dyeing, mordanting, and otherwise treating fabrics by forcing the dyeing or other liquid through a perforated pipe carrying the fabric is well known and likewise the system of treating the fabric on a winding-frame rotating in the vat of liquid, on which the fabric is coiled on bars.

The subject of my invention is an apparatus for dyeing, bleaching, mordanting, or washing fabrics or textile materials, according to which the two methods of treatment mentioned above are combined. For this purpose I provide a winding-frame, one or both ends of which are formed by hollow members, the interior of which communicate with likewise hollow trunnions. Between the two end members I arrange removable perforated pipes parallel to the axis of the trunnions. The pipes communicate with one or both of the end members and hollow trunnions, and over them the fabric to be treated is spirally wound from within outward.

By means of this apparatus the fabric can be treated much more effectively than has hitherto been the case, as each individual coil of material is thoroughly acted upon on both sides by the liquid rushing out at a high pressure through the holes of the pipes and as the fabric in consequence of the rotation of the frame is also perfectly exposed to the liquid in the vat, which is thoroughly mixed up by reason of the continuous flow from the pipes. The period necessary for treatment will also be greatly reduced as compared with the ordinary methods of dyeing, and goods of any quality can be equally well and rapidly treated, as during the process they are perfectly protected from all injurious influences.

The apparatus also presents the advantage that by employing a closed vat it can be used to dry the textile materials in rarefied air.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus. Fig. 2 is a longitudinal section on the line A B, and Fig. 3 a cross-section on the line C D, of Fig. 1. Fig. 4 is a cross-sectional view showing to a larger scale the center portion of the winding-frame. Fig. 5 is an elevation, likewise drawn to an enlarged scale, showing portions of the hollow end members of the frame with their branch pipes. Fig. 6 is a vertical section on the line E F, and Fig. 7 a horizontal section on the line G H, of Fig. 5.

The apparatus consists, essentially, of a vat *a* for the dye, mordant, bleaching or washing liquid and of a winding-frame consisting of hollow end members *b b* and removable perforated cross-pipes *c*. The members *b* are united by a solid shaft *d* and are provided with hollow trunnions *f*, located concentrically with the shaft *d* and communicating with the interior of the members *b*. Sliding pipes *g* are also provided capable of being screwed into the trunnions and passing through stuffing-boxes in the sides of the vat. The cross-pipes *c*, running parallel to the shaft *d*, communicate at one or both ends with the members *b*, so that the liquid entering through the pipes *g* and hollow members *b* under pressure flows into the pipes *c* and streams out through the apertures in the latter. The end members *b* may be formed of hollow disks or, as shown in the drawings, may consist of hollow radial arms, into which the ends of the pipes *c* pass. Any desired number of such arms may be employed, and the number of pipes *c* may also be any suitable. The drawings show an apparatus with six arms *b* at either end, which is an appropriate number, and in order that the coils of fabric *h* passing over the cross-pipes *c* may be separated by a certain space from each other these pipes are provided in pairs between the arms *b* and the pipes of one row somewhat displaced relatively to the pipes of the other row, as Figs. 3, 4, and 6 show. Each pipe is open at one end, which fits over a hollow cylindrical projection *i*, the other closed end having first been inserted into the socket *k* on the opposite end member *b* and the said socket pressed back sufficiently correspond-

ing to the length of the part *i*. The socket *k* is guided by pins *l* and forced toward the pipe end by springs *m*, whereby the opposite pipe end is firmly held to the part *i*. In the particular construction of apparatus shown in the drawings the liquid or dye-steep with which the fabric is to be treated flows from either side through the pipes *g* under the action of a force-pump *p* or the like and into the hollow arms *b* and then further into the groups of pipes *c*. If desired, however, the arrangement may be such that only one member *b* is hollow, in which case the sockets *k* have naturally only to be provided on the opposite solid end member.

When hollow members are located at both ends, the pipes *c* may likewise be open at either end. In such case the socket *k* must be provided with a hollow prolongation communicating with the inside of the hollow end members *b* and must, with the pipe end, admit of being pushed into the interior of the member *b* to a certain extent corresponding with the length of the part *i*. In this manner the liquid would flow into the pipes *c* at either end.

For the purpose of decreasing the surface which receives the fabric the pipes *c* may be sinuous or fluted.

In order to wind the fabric or textile materials on the frame, it will be found most convenient to remove the latter from the vat *a*, for which purpose suitable apparatus may be provided. The pipes *c* of the circle next adjacent to the shaft *d* are first inserted and the fabric wound on, and then further in spiral manner over the successive circles of pipes as inserted until the whole piece is coiled on the frame. Depending upon the closeness of the web and the particular treatment, two or more coils of fabric may be wound over the same circle of pipes. The thus-filled frame is now introduced into the vat *a*, previously filled with the dyeing or other liquid, in such manner that the pipes *g* can be screwed into the trunnions *f*. The pipes *g* are jointed to the delivery-pipes *o* of the pump by means of stuffing-boxes *r*, in which the pipes *g* can both turn and slide. When now the pump *p*, which draws the liquid or steep from the bottom of

the vat, is started, the liquid will be forced through the pipes *o* into the end members *b b* and thence into the pipes *c*, through the perforations of which it will stream out in fine jets, as shown in Fig. 4, in the case of two groups of pipes both above and below the fabric. The latter is at the same time rotated in the liquid by means of a belt or the like, and it is obvious that through the jets of liquid issuing from the pipes *c* on all sides and through the continuous movement of the fabric in the vat the fabric will be most thoroughly and uniformly acted upon and the period of treatment essentially shortened.

Should it be desired to dry the fabric, this can be done also by means of the winding-frame. In such case the latter must be placed in an air-tight vessel between pipes connected with an air-pump, whereby the air is sucked from the winding-frame—that is to say, from the vessel—the frame being set in rotation. In consequence of the rapid evaporation in the rarefied air (which may be assisted by heat, for example, by the aid of heating-pipes introduced into the vessel) the fabric can be dried in the shortest possible space of time.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

Apparatus for dyeing, bleaching, mordanting, washing and drying fabric, comprising a vat, and a winding-frame rotating within the same, consisting of longitudinally-extending hollow, removable, perforated, cross members arranged in a plurality of circles of different diameters over each of which the fabric can be spirally wound, and means for supporting the same at either end, the cross members communicating with the interior of said supporting means, whereby liquid may be forced through the winding-frame, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FRIEDRICH CLEFF.

Witnesses:

OTTO KÖNIG,
J. A. RITTERSHAUS.